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**TILLAGE DISC AND ASSEMBLY**

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(56) Prior Art Documents  
561553 14199/83 A01B  
23898/84 A01B  
33063/84 A01B

(57) Claim

1. A tillage disc having walls forming a convex outer side and a concave inner side, each of which is generally conical for portion at least of its area, said conical portion terminating in the disc periphery, the disc periphery of the convex and concave sides being joined by a bevel surface which slopes upwardly and inwardly, characterized in that a cutting edge is defined between the conical portion of the convex side of the disc and said bevel surface.

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COMPLETED PROVISIONAL SPECIFICATION No.

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952-1966

APPLICATION FOR A PATENT

60

We PYNARI NOMINEES PTY. LTD.

of Kimba, State of South Australia,  
Commonwealth of Australia.

hereby apply for the grant of a Patent for an invention entitled "IMPROVEMENTS  
IN TRASH FARMING IMPLEMENTS"

which is described in the accompanying provisional/complete specification.

My/Our address for service is care of R. K. MADDERN & ASSOCIATES, Patent  
Attorneys, 92 King William Street, Adelaide, South Australia.  
345

Dated this 15th day of February 1985

PYNARI NOMINEES PTY. LTD.,

By its Patent Attorneys,  
R.K. MADDERN & ASSOCIATES.

R.K. MADDERN

TO:

THE COMMISSIONER OF PATENTS,  
CANBERRA, A.C.T.

APPLICATION ACCEPTED AND AMENDMENTS

RECEIVED 19.5.89

(Note: To be signed by the applicant(s), or if a Company, to be signed by a person on its behalf. Any inappropriate to a particular application should be cancelled).

COMMONWEALTH OF AUSTRALIA  
Patents Act 1952-1969

DECLARATION IN SUPPORT OF AN APPLICATION FOR A PATENT OR PATENT OF ADDITION

INSTRUCTIONS

Insert if available.

Full name(s) of applicant(s).

Title of invention.

In support of the Application  
made by

PYNARI NOMINEES PTY. LTD

for a patent/patent of addition for an invention entitled

"IMPROVEMENTS IN TRASH FARMING IMPLEMENTS"

Full name(s) of declarant(s).

IAN GORDON FRANCIS LEIBLICH

Address(es) of declarant(s).

of Kimba, State of South Australia,  
Commonwealth of Australia

do solemnly and sincerely declare as follows:—

1. I am/We are the applicant(s) for the patent/patent of addition  
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1. I am/We are authorized by the abovementioned applicant(s) for the patent/patent of addition  
to make this declaration on its/their behalf.
2. I am/We are the actual inventor(s) of the invention  
(or, where a person other than the inventor is the applicant)

Full name(s) of actual inventor(s).

2. GORDON FRANCIS LEIBLICH

Address(es) of actual inventor(s).

of Kimba, State of South Australia,  
Commonwealth of Australia

Recite manner in which applicant(s) derive(s) title from actual inventor(s).

is/are the actual inventor(s) of the invention and the facts upon which the applicant(s) is/are entitled to make the application are as follows:—

By virtue of the provisions of Section 34(1) (fa)  
of the Patents Act 1952-1979.

Declared at Kimba this 15th day of March 1985

Signature(s) of declarant(s).

(Note: No attestation or other signature is required).

G. J. Leiblich

To: The Commissioner of Patents,



COMMONWEALTH OF AUSTRALIA  
PATENTS ACT 1952-62

# COMPLETE SPECIFICATION

(ORIGINAL)

FEE ST-M C VILLE 16  
120 A PAID  
MAIL OFFICE

FOR OFFICE USE:

Application Number:  
Lodged:

Class

Int. Class

53681/86.

Complete Specification Lodged:  
Accepted:  
Published:

Priority:

Related Art:

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## TO BE COMPLETED BY APPLICANT

PYNARI NOMINEES PTY. LTD.

Name of Applicant:

Kimba, State of South Australia,  
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Actual Inventor:

GORDON FRANCIS LEIBLICH

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care of R.K. MADDERN & ASSOCIATES, 345  
King William Street, Adelaide, South  
Australia, 5000

Complete Specification for the invention entitled:

"IMPROVEMENTS IN TRASH FARMING  
IMPLEMENT"

The following statement is a full description of this invention, including the best method of performing it  
known to us.

This invention relates to improvements in trash farming implements, and although it is not limited to the improvements in trash farming means and method the subject of our Australian Patent Application No.

5 14197/83, it is nevertheless particularly suited for use in a machine as described in that specification.

In that specification there was described and claimed a trash farming implement having tillage discs and soil replacement discs arranged in pairs across the 10 width of the machine, each tillage disc functioning to transport soil transversely, and each soil replacing disc functioning to replace that soil in the furrow cut by the tillage disc. One of the functions referred to in the specification was that of seeding, by passing 15 seed and superphosphate through a tube and deflecting the passage beneath the tillage disc. Using that machine for seeding had a very important advantage in that the seed depth below the soil was far more nearly constant than in prior art seeders using conventional seeding 20 machines.

While the configuration of the soil replacement disc does not appear to be very critical, it has been found that difficulties can be encountered with the tillage disc, and if a disc of curved cross-sectional 25 shape is used, there tends to be a build up of soil near the periphery of the disc on its convex side, which soil forms an annular ring adhering to the disc, which interferes with the smooth movement of soil transversely over the convex side thereof. Furthermore, the disc 30 is used on a much flatter angle than the usual disc and consequently if a conventional type disc is used, the bevelled edge is presented to the soil and this constitutes a very considerable resistance and the consequential considerable forces will cause blunting 35 of the sharp edge, and consequentially require more power to move the disc through the soil.

With the object of overcoming these difficulties,

in one embodiment of the invention the tillage disc has walls forming a convex outer side and a concave inner side, each of which is generally conical for portion at least of its area, said conical portion terminating in the disc periphery, the  
5 disc periphery of the convex and concave sides being joined by a bevel surface which slopes upwardly and inwardly, characterized in that a cutting edge is defined between the conical portion on the convex side of the disc and said bevel surface.

10 With this arrangement, the part of the disc which wears most by abrasion is the bevel, and consequently there is a self-sharpening effect at least to some degree, and further, there is an upward flow of soil over the conical outer face of the disc as the disc passes through the soil, this avoiding the otherwise quite serious cavitation which occurs due to soil build-up on a disc of the conventionally curved cross-sectional shape.

15 Although a machine constructed in accordance with the specification of the Australian Application No. 14197/83 is normally employed to have the same angle of inclination of rotation of the tillage disc no matter what soil it is used in, nevertheless there are different requirements for depth of planting of seed in different soils. As pointed out in that specification, the furrow which is cut is a shallow acute angled triangle in cross-section, and seed depth is unlikely to vary provided the seed is deflected into the furrow at approximately the same location. However that location will need to vary for different soil conditions and different moisture contents of the soil, and in an embodiment of this  
20 invention the bearing of each tillage disc surrounds a mounting tube from which depends a discharge conduit the discharge end of which is inclined to the axis of the tube, and locating means which fix the discharge conduit with respect to the tube in any selected one of a number of positions circumferentially  
25 displaced from one another around the axis of the mounting tube. This enables the discharge to be deflected to a selected place in the furrow which can be varied for different  
30  
35



planting depth requirements.

An embodiment of the invention is described hereunder.

In this embodiment, a tillage disc 10 for a machine 5 of the type described in our said Australian Application No. 14197/83, is provided with conical walls 11 for most of its area, the walls being curved in cross-section only near the central hub 12. The disc is bolted to a bearing housing 13 containing bearings 14 and seals 10 15 in a bearing assembly 16 which is generally in accordance with known art. The bearings themselves surround and engage a mounting tube 17 through which an elbow-shaped discharge conduit 18 extends.

The edge 21 which is the sharp edge of the disc 15 is the lower outer peripheral edge, and there is provided a bevel 22 on the concave underside of the disc which, in use, abrades the soil and the edge is thereby maintained sharp to some extent, and furthermore the bevel in being on the concave underside instead of the 20 convex side does not present a bluff face to the soil as the disc traverses the soil.

The upper end of the mounting tube 17 is provided with a flat plate 24 and a pin 25 upstanding from that flat plate, and the discharge conduit 18 is a monolithic 25 moulding of polyurethane or other elastomeric material which extends through the mounting tube 17, having a lower discharge end 26 which is angled to function as a deflector. The upper end has a flange 27 with a series of peripheral notches or slots 28 which are 30 circumferentially spaced and extend radially inwardly, and these are arranged to selectively engage the upstanding pin 25. The angle of the discharge conduit can thereby be readily varied by simply deflecting the periphery of the elastomeric flange and repositioning 35 it over the pin. Screw-threaded clamping means (not shown) can be used if required.

The machine is provided with a grain box and a superphosphate box, and delivery stars which are arranged

to deliver metered quantities of superphosphate and grain  
into respective conveyor tubes, each conveyor tube  
terminating at its lower end in a respective discharge  
conduit 18. By this means it is possible to use a  
5 reduced amount of air flow, and in some instances to  
completely avoid air flow.

A consideration of the above embodiment will  
indicate that the invention is one of great simplicity  
but is nevertheless found to provide a marked improvement  
10 over prior art.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A tillage disc having walls forming a convex outer side and a concave inner side, each of which is generally conical for portion at least of its area, said conical portion terminating in the disc periphery, the disc periphery of the convex and concave sides being joined by a bevel surface which slopes upwardly and inwardly, characterized in that a cutting edge is defined between the conical portion of the convex side of the disc and said bevel surface.
2. A tillage disc assembly comprising a tillage disc according to claim 1, a mounting tube, a bearing assembly between the tillage disc and mounting tube, a discharge conduit depending from the mounting tube and having a discharge end inclined with respect to the mounting tube, and locating means co-operable between the discharge conduit and the mounting tube in any selected one of a number of positions circumferentially displaced from one another about the axis of the mounting tube.
3. A tillage disc assembly according to claim 2 wherein said discharge conduit extends through the whole length of the mounting tube and wherein said locating means comprises an outstanding flange having a plurality of circumferentially spaced slots each extending radially inwardly from the periphery of the flange, there being a pin upstanding from, but fixed with respect to, the mounting tube, the conduit being rotatable within the mounting tube so that said slots are selectively positionable over said pin.
4. A tillage disc assembly according to claim 3 wherein said discharge conduit is of flexible and resilient material, and said slots are selectively positionable over said pin by deflection of said flange.

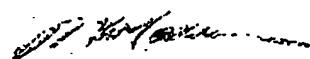


5. A tillage disc substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

6. A tillage disc assembly substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

Dated this 14th day of February, 1986.

PYNARI NOMINEES PTY. LTD.  
By their Patent Attorneys  
R.K. MADDERN & ASSOCIATES



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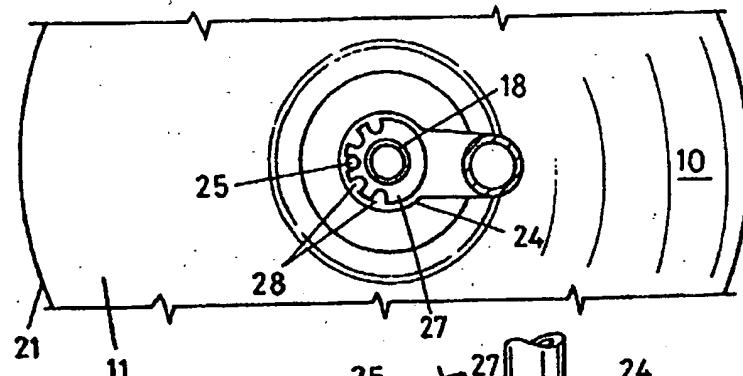
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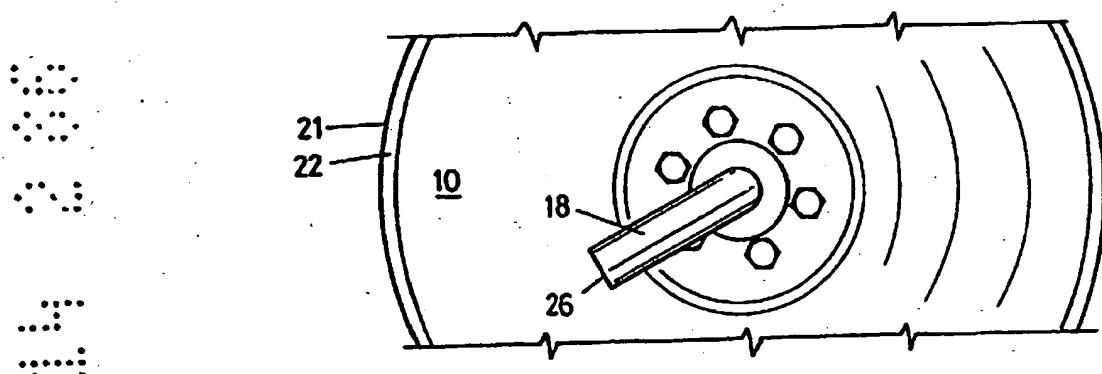
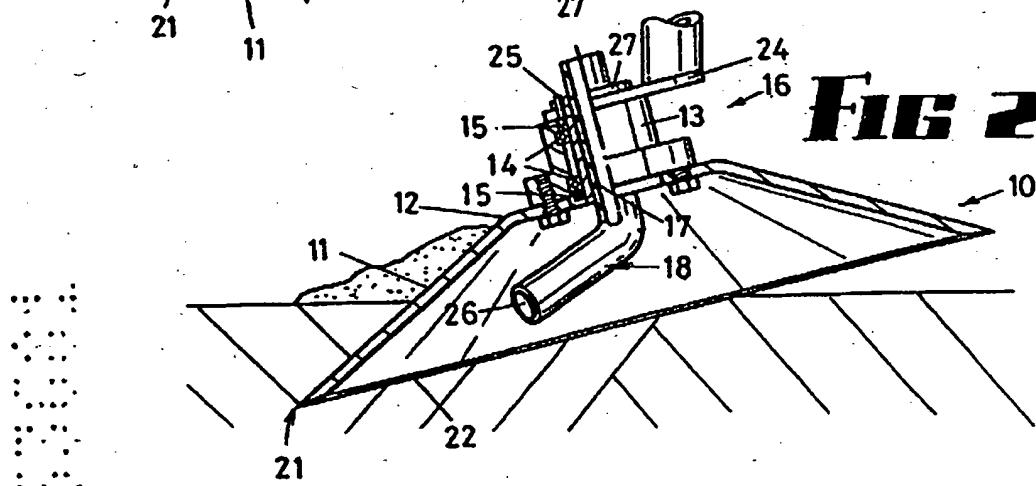
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**FIG 1**

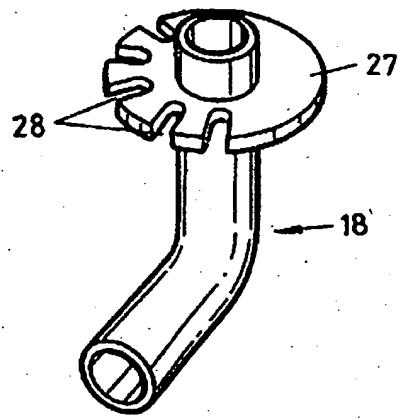
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**FIG 2**



**FIG 3**



**FIG 4**

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